State & Federal Energy Storage Technology Advancement Partnership (ESTAP)

Todd Olinsky-Paul

Clean Energy States Alliance

September 17-19, 2014

CleanEnergy States Alliance

Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY

ESTAP is a project of CESA

Clean Energy States Alliance (CESA) is a non-profit organization providing a forum for states to work together to implement effective clean energy policies & programs:

- Information Exchange
- Partnership Development
- Joint Projects (National RPS Collaborative, Interstate Turbine Advisory Council)
- Clean Energy Program Design & Evaluations
- Analysis and Reports

CESA is supported by a coalition of states and public utilities, by federal contracts, and by foundation grants.

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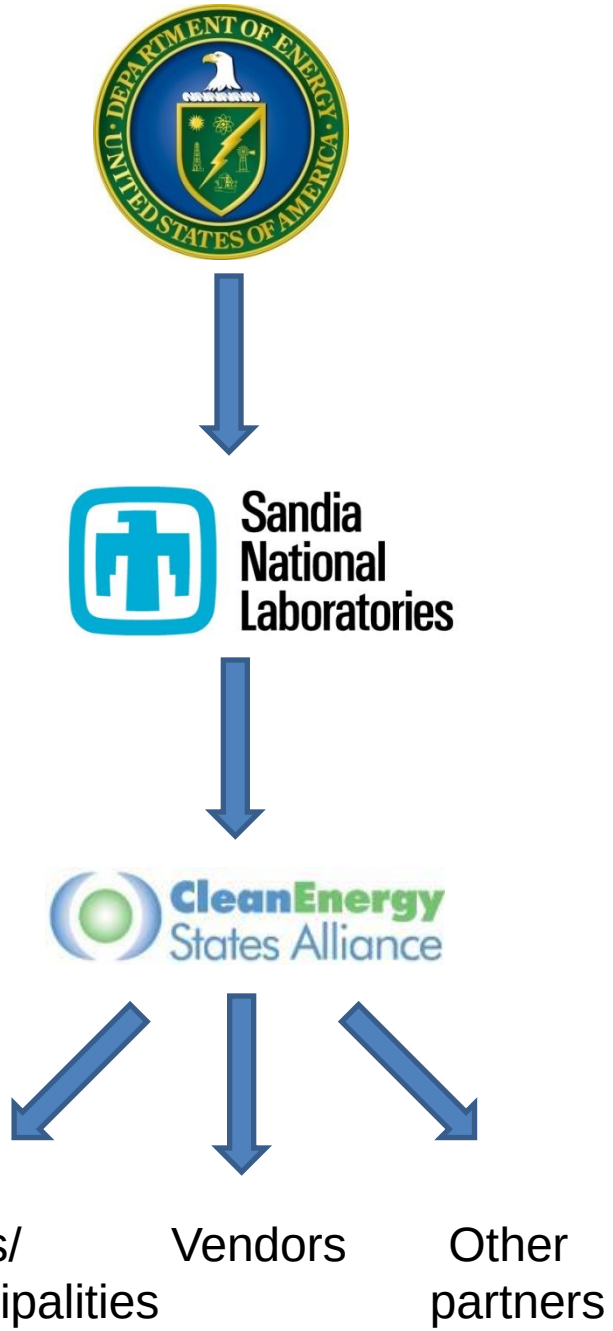
ESTAP* Overview

Purpose: Create new DOE-state energy storage partnerships and advance energy storage, with technical assistance from Sandia National Laboratories and funding from DOE-OE

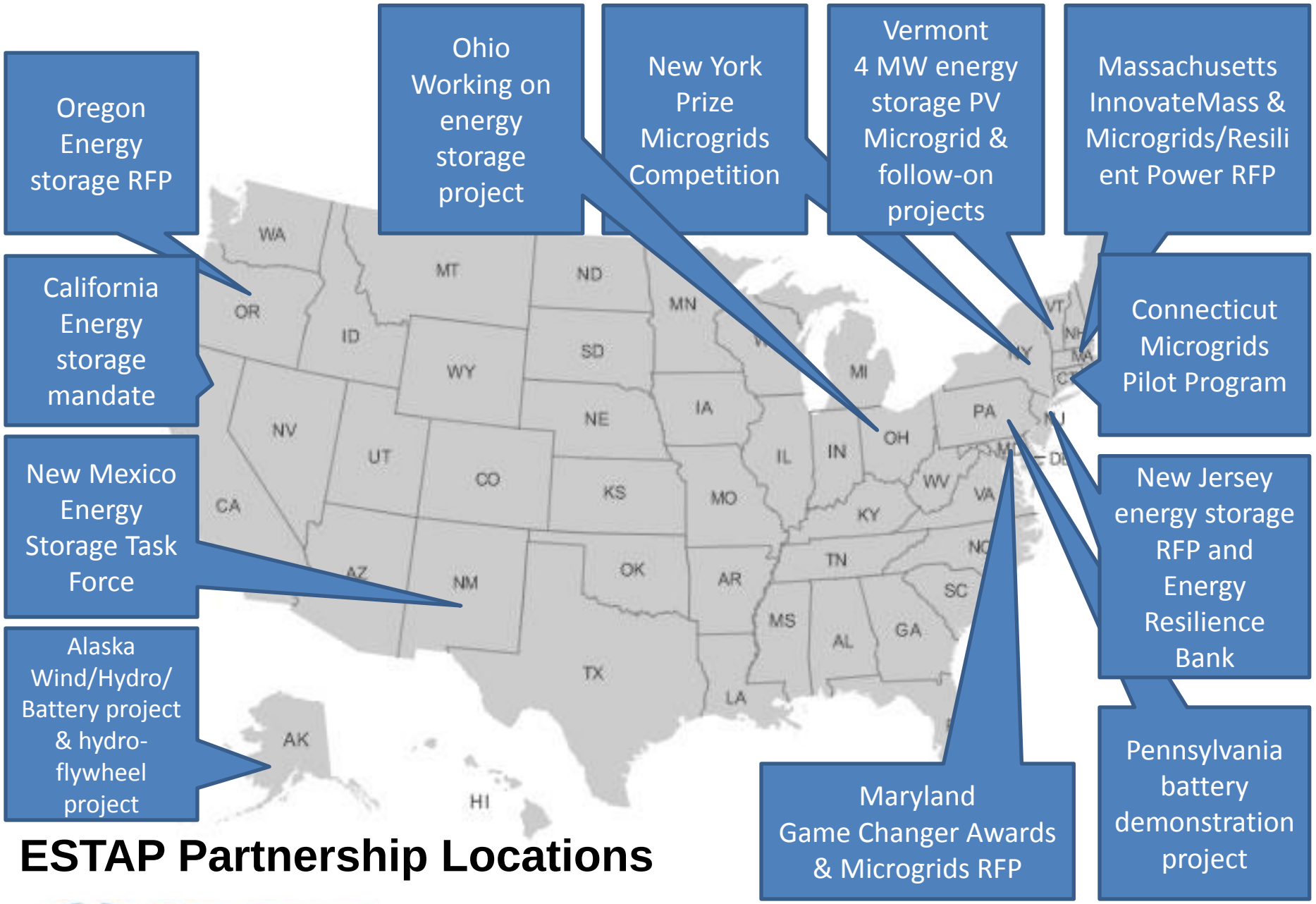
Key Activities:

1. Disseminate information to stakeholders
2. Facilitate federal/state partnerships to support energy storage **program development** and **project deployment**

Outcome: Energy storage project deployments across the U.S. with co-funding from states, project partners, and DOE



* **(**Energy Storage Technology Advancement Partnership)



ESTAP Partnership Locations

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A Blast from the Past -> September, 2012:

Why work with states?

Surveys Indicate Strong State Interest in Storage

- 75% of states responding "very interested" in collaborating on energy storage technology projects with DOE, especially commercial & demonstration projects.

States Have Resources

- From 1998-2009, state clean energy funds incentivized 70,000 projects – 3 GW of installed capacity – with $2.7b
- With Renewable Energy Public Benefit Funds alone (18 states & DC), states will spend $7.8b by 2017

States Are Important Partners

- Many state partners also have jurisdiction over utilities, resource planning, transmission and project siting, etc.
- State-stakeholder partnerships can ignite project ideas and creative funding arrangements

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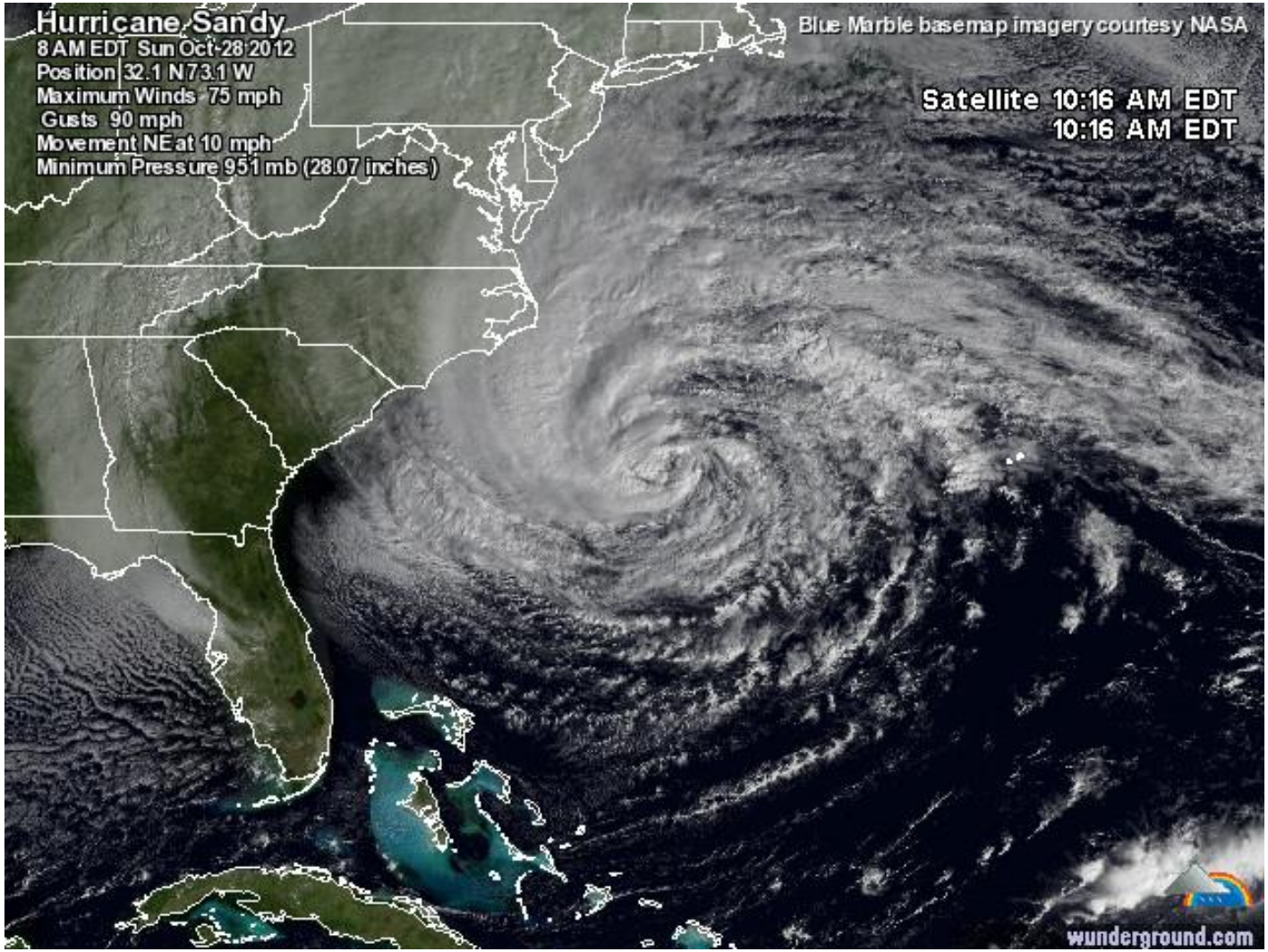
Hurricane Sandy

October 29, 2012

$37 Billion in damages



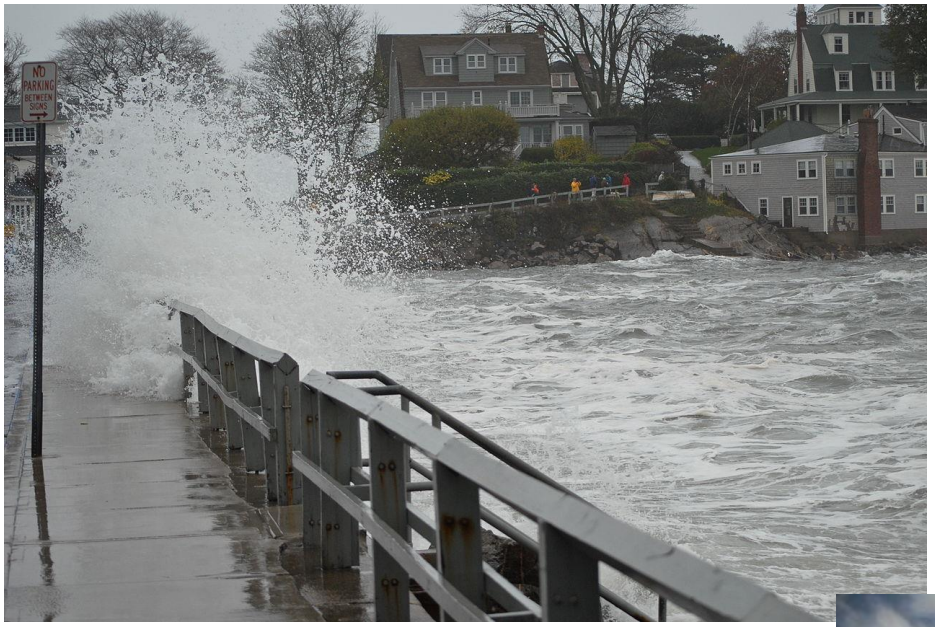
New York

New Jersey

Hoboken

Seaside Heights

Marbletown, Massachusetts



Milford, Connecticut

Northeastern States
Resilient Power Initiatives

Following Superstorm Sandy, the Northeastern states came to CESA/CEG seeking help in developing resilient power solutions.

CESA/DOE/Sandia role:

- Assist in RFP development
- Provide information to project developers
- Help to evaluate project proposals
- DOE $ contribution to support qualifying projects
- Monitor and evaluate project performance once complete

Results

- **Connecticut** Department of Energy and Environmental Protection (DEEP): $48 Million, 3-year Microgrid Grand and Loan Pilot Program
- **New Jersey** Board of Public Utilities (BPU): $10 Million Energy Storage Program and $200 Million Energy Resilience Bank
- **Massachusetts** Division Of Energy Resources (DOER): $40 Million Community Clean Energy Resiliency Initiative
- **New York** State Energy Research and Development Authority (NYSERDA): $40 Million NY Prize microgrids competition
- **Maryland** Energy Administration Microgrids RFP: Coming This Fall

TOTAL: $340 Million in new state funds in the Northeast alone

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Connecticut DEEP
Microgrid Grant and Loan Pilot Program

- $45 million total state allocation
- Three year program
- Focus on municipal critical infrastructure projects

Round 1 Results

- Nine project grants awarded
- Two included electricity storage

Round 2 Results

- Five microgrid proposals
- Two include electricity storage
- Proposals under evaluation

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New Jersey BPU
Energy Resilience Bank

- $200 Million in federal disaster relief funds
- Co-managed by NJ Board of Public Utilities and New Jersey Economic Development Authority
- 100% of unmet needs met through combination of grants and loans
- Energy storage with PV is an eligible technology
- First funding round = $65 Million for water and wastewater treatment plants

New Jersey BPU
Energy Storage Incentive Program

- $10 Million, 4-year grant program
- Focus on critical infrastructure
- Energy storage devices must be paired with renewable generation
- Emphasis on projects that can be completed within 1 year
- Desire to build a sustainable market that does not rely on state funding
- Presence of storage can firm PV production, allowing it to participate in other incentive programs

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Massachusetts DOER
Community Clean Energy Resiliency Initiative

- $40 million state incentive
- $ coming from ACP payments
- Focus on critical infrastructure
- Municipalities will apply
- Round 1 (technical assistance grants) is complete

* MassCEC pursuing additional energy storage projects

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New York NYSERDA
NY Prize Microgrid Challenge

- $40 million competition
- “Community-based microgrids”
- NYSERDA seeking stakeholder input this fall

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Maryland MEA Microgrids Initiative

WATCH THIS SPACE

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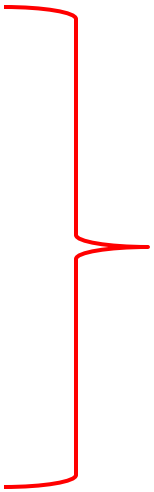
Revisioning the Grids

In addition to these resilient power initiatives, a few states have begun a process of revisioning the electric grid:

- New York
- Massachusetts
- Hawaii

Grid modernization initiatives are focusing on:

- More distributed clean generation
- Greater role for distribution utilities
- Smartgrid and microgrid development
- Peak shifting and reduction of grid overcapacity
- Reduced outages, greater resiliency
- Optimized demand
- Improved asset management



Opportunities for energy storage

Meaningless Graphs

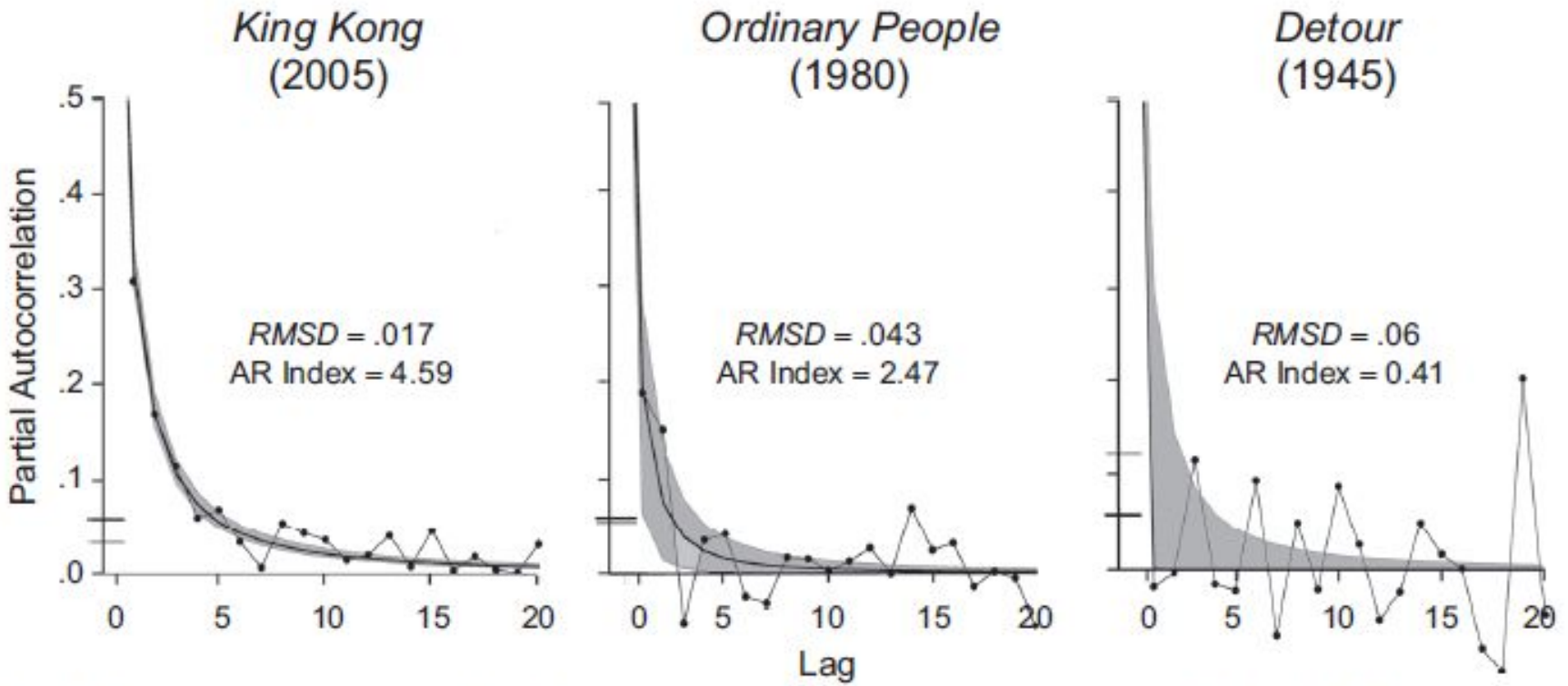


Fig. 1. Raw partial autocorrelations of three films as a function of lag (the ordinal distance between shots whose lengths are being compared). The thick lines represent the fits of a negative exponential function ($1/[\text{lag} + 1]^{\beta}$); that for *Detour* is thrust up against the ordinate and so cannot be seen. From left to right, the panels show results for films with the best, median, and worst fits across the 150 films. The ordinate is truncated because the Lag 0 value of 1.0 is uninformative. Gray areas indicate 95% confidence intervals around the best fit, determined by bootstrap. The additional tick marks on the ordinate indicate the upper bound of significant partial correlations; the thick mark is based on the mean number of shots across all films, and the thin one is based on the number of shots in the given film. Our modified autoregressive index (AR index) for each film (see Figs. 2a and 2b) was determined by the intersection of the exponential function and the mean upper bound for all films. *RMSD* is the root-mean-squared deviation between the fitted function and the raw data.


Vermont

Vermont DPS
Clean Energy Development Fund
Electrical Energy Storage Demonstration Program

- Primary objective: to support the integration of renewables into the grid
- DOE, Sandia and CESA aided in developing RFP
- State contribution: $50,000
- DOE contribution: $250,000
- State issued solicitation, received and reviewed proposals
- Winning project: $10 - $11 Million PV-powered microgrid developed by Green Mountain Power (utility)

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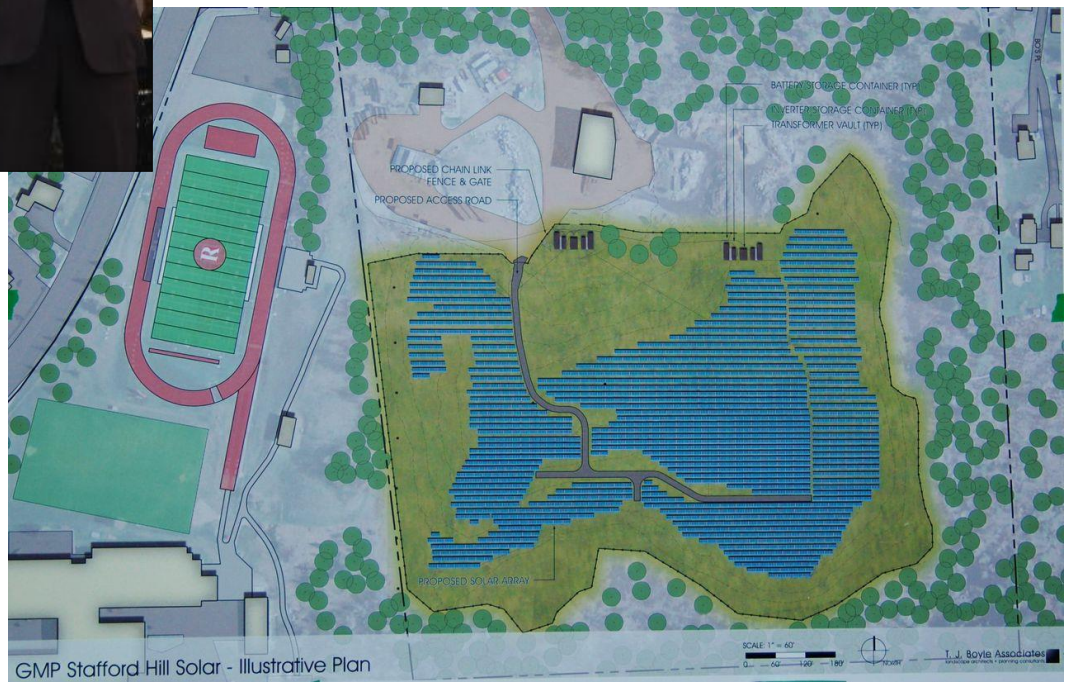
4 MW Energy Storage + PV Microgrid in Vermont

- 4 MW electricity storage
  - 2 MW lithium ion
  - 2 MW lead acid
- 2 MW solar PV
- 2 MW inverter capacity

- Brownfield redevelopment (sited on closed landfill)
- Resilient power for school serving as public shelter
- Future expansion planned



Oregon Energy Storage RFP

- Oregon DOE is following the “Vermont Model”
- RFI, workshop and other stakeholder input complete
- Energy storage RFP expected this Fall

www.cleanenergystates.org/projects/energy-storage-technology-advancement-partnership/

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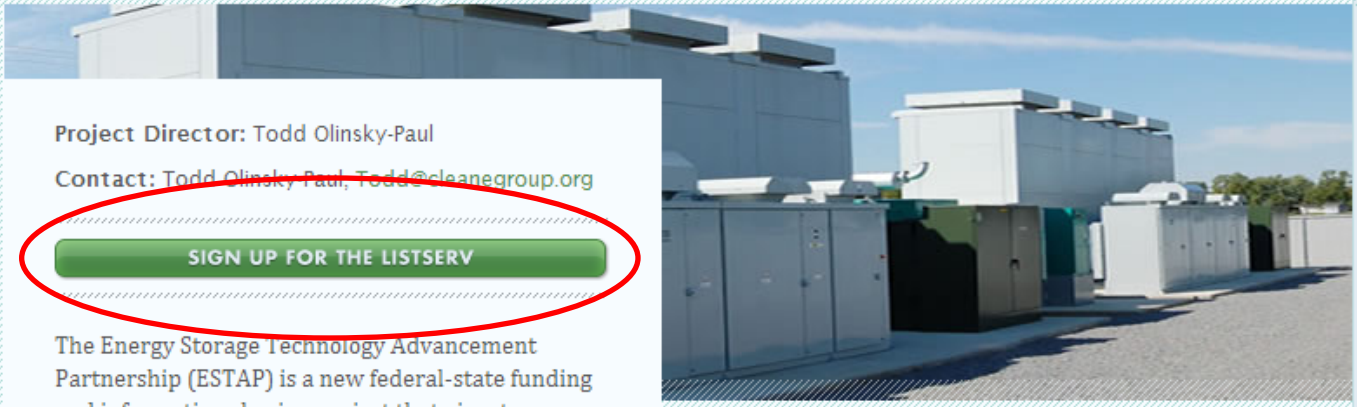

Project Director: Todd Olinsky-Paul

Contact: Todd Olinsky-Paul, Todd@cleanegroup.org

SIGN UP FOR THE LISTSERV

The Energy Storage Technology Advancement Partnership (ESTAP) is a new federal-state funding and information sharing project that aims to accelerate the deployment of electrical energy storage technologies in the U.S. The value proposition for participating states is to work closely with the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability (DOE-OW) on near-term joint funding and technology deployment, to join a network of leading states supporting energy storage technology, and to achieve faster progress in electrical energy storage commercialization and economic development.

Background

NEW RESOURCES

May 16, 2013

CESA Webinar Recording: Smart Grid, Grid Integration, Storage and Renewable Energy

By CESA

UPCOMING EVENTS

June 18, 2013

ESTAP Webinar: An Overview of the Electricity Storage Handbook,

More Events

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Thank You:

Dr. Imre Gyuk
U.S. Department of Energy,
Office of Electricity Delivery and
Energy Reliability

Dan Borneo
Sandia National Laboratories

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Thank You

Todd Olinsky-Paul
Clean Energy States Alliance
Energy Storage Technology Advancement Partnership (ESTAP)
Todd@cleanegroup.org

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